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EXAMINER	
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ART UNIT	PAPER NUMBER
2626	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No.	Applicant(s)	
	10/736,939	MACOURS, CHRISTOPHE MARC	
	Examiner	Art Unit	
	JOSIAH HERNANDEZ	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 May 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 01/04/2008 have been fully considered and after revision of the remarks received the arguments are considered to be non-persuasive.

The remarks claim that the title is clearly indicative of the invention and that the prior art reference does not teach gain factors of specific values.

As to the objection to the title it is maintained that the title is not indicative of the invention. The title broadly states "a system and method for audio signal processing". This title can fall into almost every category of speech processing such as: speech recognition, synthesis, analysis, coding, decoding, speech enhancement, noise reduction, Vocal tract resonance, etc... of which vary distinctly one from another. The applicant is reminded that one of the purposes that the patent office requires an indicative title is for searching purposes. Searching through properly indicative titles enhances the ability to search prior art more effectively and thus providing quality patent prosecution which benefits every body in the prosecution cycle. A title as broad as "a system and method for audio signal processing" cannot possibly indicate the area of technology that the invention is associated with.

Vierthaler (US PGPUB 2002/0173950) teaches a system that uses specific gain values and thus it would be inherent that in order for the calculations of the gain values to be applied the gain value in any one of the ranges used would have to by greater

than zero or else the gain would be zero and no gain would exist at all, defeating the purpose of what a gain is used for. As to the other specific values, according to the specification, there is no explanation as to why specifically the values (10dB, 12dB, 6dB, etc...) where chosen, no indication as to why, by choosing these specific values, the system would output unpredictable and non-obvious results that would enhance the system. With out specific explanation, it could be interpreted that the values where chosen at random and if so, the references that were used would be more than capable of producing the same predictable results if the same values were applied.

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 4-6, 8, and 10-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ubale et al. (US 6,363,338) in view of Vierthaler (US PGPUB 2002/0173950).

As to claims 1 and 18, Ubale discloses a sound reproduction or recording system (abstract lines 1-2) comprising an audio signal input (1) (the signal is input to the analysis filter, column 3 lines 25-30), an audio signal processor (2, DSP) (the signal is quantized after passing through the analysis filter, abstract lines 3-5) and an audio signal output (1) (column 3 lines 30-35) wherein the audio signal processor comprises an attributor (25) for attributing a gain factor (z) to input signals (In) as a function of input level (y) (the gain factor is calculated based on the input signal, column 14 lines 26-30).

Ubale does not disclose specifically a gain factor with a functional relationship such that the functional relationship between gain factor (z) and input level (y) comprises a first (I) and second range (II), the first range (I) covering amplitudes in which mainly voiced phonemes are situated, the second range (II) situated at input levels (y) lower than those for the first range (I) and covering input levels in which mainly unvoiced phonemes are situated, wherein the functional relationship is such that the average gain factor for the first range (I) lies at least 6 dB below that for the second range (II). Vierthaler teaches using a gain value adjustable in range (paragraph [0022]) of which is used to amplify certain regions of the signal particularly two regions that occur, a vowel of which

has a range of low frequency and high amplitude of which is one range and a second range which is a consonant marked by a high frequency and low amplitude (paragraph [0028] lines 1-6) an amplification is made to enhance these two ranges by having a difference of 6dB between the ranges (paragraph [0028] lines 6-12) and by amplifying the consonants relative to the vowel the intelligibility of speech in the audio signal is increased (paragraph [0004] lines 12-20).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Ubale with the method of using a gain factor specifically for a voice and unvoiced part of a speech as taught by Vierthaler. Doing so would have allowed for intelligibility to be increase by emphasizing the areas are hard to understand or hear when there is a vowel-consonant combination (paragraph [0004] lines 1-20).

As to claims 2 and 19, Ubale discloses a sound reproduction or recording system (abstract lines 1-2) comprising a digital audio signal input (1) (the signal is input to the analysis filter, column 3 lines 25-30), a digital audio signal processor (2, DSP) (the signal is quantized after passing through the analysis filter, abstract lines 3-5) and a digital audio signal output (1) (column 3 lines 30-35) wherein the digital audio signal processor comprises an attributor (25) for attributing a gain factor (z) to input signals (In) as a function of input level (y) (the gain factor is calculated based on the input signal, column 14 lines 26-30).

Ubale does not disclose specifically a gain factor with a functional relationship wherein the functional relationship between gain factor (z) and the input level (y) is such that a first (I) and second range (II) are present, the first range (I) extending from a maximum value input level (MAX) downwards at least 10 dB, the second range (II) extending at input levels below the first range (II), said second range covering a range of 10 db or more, wherein the average gain factor (z) in the first range (II) is at least on average 6 dB lower than in the second range (II). Vierthaler teaches using a gain value adjustable in range (paragraph [0022]) of which is used to amplify certain regions of the signal particularly two regions that occur, a vowel of which has a range of low frequency and high amplitude of which is one range and a second range which is a consonant marked by a high frequency and low amplitude (paragraph [0028] lines 1-6) an amplification is made to enhance these two ranges by having a gain of 6dB between the ranges (paragraph [0028] lines 6-12) and by amplifying the consonants relative to the vowel at -10dB limiting, the intelligibility of speech in the audio signal is increased (paragraph [0004] lines 12-20).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Ubale with the method of using a gain factor specifically for a voice and unvoiced part of a speech as taught by Vierthaler. Doing so would have allowed for intelligibility to be increase by emphasizing the areas are hard to understand or hear when there is a vowel-consonant combination (paragraph [0004] lines 1-20).

As to claims 4 and 20, Ubale does not disclose specifically a sound reproduction or recording system as claimed in claim 1 wherein the attributor (25) for attributing a gain factor (z) is arranged such that the gain factor (z) in the first range (I) is at least 12 dB lower than in the second range (II). Vierthaler teaches that consonants are 12 dB weaker in amplitude than the vowels (paragraph [0004] lines 6-20) making the first range at least 12 dB lower than in the second range.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Ubale with the method of using a gain factor specifically for a voice and unvoiced part of a speech as taught by Vierthaler. Doing so would have allowed for intelligibility to be increase by emphasizing the areas are hard to understand or hear when there is a vowel-consonant combination (paragraph [0004] lines 1-20).

As to claims 5, 21, 27, and 28, Ubale does not disclose specifically a sound reproduction or recording system as claimed in claim 1, wherein the attributor for attributing a gain (z) is arranged such that average gain factor for ranges I and II is less than 12 dB, preferably less than 6 dB, even more preferably less than 3 dB. Vierthaler teaches that consonants are 12 dB weaker in amplitude than the vowels (paragraph [0004] lines 6-20) making the first range at least 12 dB lower than in the second range.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Ubale with the method of using a gain factor specifically for a voice and unvoiced part of a speech as taught by Vierthaler. Doing so would have allowed for intelligibility to be increase by emphasizing the areas are hard to understand or hear when there is a vowel-consonant combination (paragraph [0004] lines 1-20).

As to claim 6, Ubrale does not disclose a sound reproduction or recording system as claimed in claim 1, wherein the system comprises a dynamic level detector (41, 111) having an input for the signal amplitude (In) and an output for providing an average level (y) over a predetermined time period. Vierthaler teaches a method of using an attack and release time of 10 ms and 75 ms for determining the input levels of the signals (paragraph [0009]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Ubale with the method of detecting levels as taught by Vierthaler. Doing so would have allowed for the system to know when a vowel or consonant is present so the correct gain factor can be applied.

As to claim 8, Ubale does not disclose specifically a sound reproduction or recording system as claimed in claim 1, wherein the attributor (25) for attributing a gain factor (z) is arranged such that the gain factor (z) in the first range (I) is on

average below 10 dB, preferably below 6 dB. Vierthaler teaches using a gain value adjustable in range (paragraph [0022]) of which is used to amplify certain regions of the signal particularly two regions that occur, a vowel of which has a range of low frequency and high amplitude of which is one range and a second range which is a consonant marked by a high frequency and low amplitude (paragraph [0028] lines 1-6) an amplification is made to enhance these two ranges by having a gain of 6dB between the ranges (paragraph [0028] lines 6-12) and by amplifying the consonants relative to the vowel at -10dB limiting, the intelligibility of speech in the audio signal is increased (paragraph [0004] lines 12-20).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Ubale with the method of using a gain factor specifically for a voice and unvoiced part of a speech as taught by Vierthaler. Doing so would have allowed for intelligibility to be increase by emphasizing the areas are hard to understand or hear when there is a vowel-consonant combination (paragraph [0004] lines 1-20).

As to claims 10 and 22, Ubale discloses a sound reproduction or recording system as claimed in claim 1, wherein the attributor (25) for attributing a gain factor (z) to input signals (In) as a function of input level (y) is arranged such that the functional relationship between gain factor (z) and the input level (y) is such that between the first (I) and second (II) range a third, intermediate range (III) is

present in which the gain factor (z) changes gradually (the gain factor calculated between the gain factor of the voice and unvoiced region changes in gradual intervals. The formula of gain factor calculation includes an independent variable K and as K increases gradually so does the gain factor, column 14 lines 23-30).

As to claim 11, Ubale discloses a sound reproduction or recording system as claimed in claim 1, wherein the system comprises a sensor (26) for measuring background noise (N2), and an adjustor for adjusting the gain factor (z) in the second range (II) independency on the measured background noise (N2) (column 14 lines 28-37).

As to claims 12 and 23, Ubale discloses a sound reproduction or recording system as claimed in claim 1, wherein the attributor for attributing (25) a gain factor (z) is arranged such that the second range (II) is, at a lower boundary value juxtaposed by a fourth range (IV) in which the gain factor is substantially zero (the lowest boundary starts at 0 dB and gradually increases as shown by the formula, column 23 lines 1-30).

As to claims 13 and 24, Ubale discloses a sound reproduction or recording system as claimed in claim 12, wherein the attributor (25) for attributing a gain factor (z) to input signals (In) as a function of input level (y) is arranged such that the second (II) and fourth (IV) range (the lowest boundary starts at 0 dB and

gradually increases as shown by the formula, column 23 lines 1-30) are separated by a fifth (V), intermediate range within which the gain factor (z) gradually changes (the gain factor calculated between the gain factor of the voice and unvoiced region changes in gradual intervals. The formula of gain factor calculation includes an independent variable K and as K increases gradually so does the gain factor, column 14 lines 23-30).

As to claims 14 and 25, Ubale discloses a sound reproduction or recording system as claimed in claim 12 wherein the attributor for attributing (25) a gain factor (z) to input signals (In) as a function of input level (y) is arranged such that that the slope of the decrease in gain factor in the third range (III) is softer than the rise in gain factor in the fifth range (V) (the quantization of the signal, of which the gain factor is included, uses a log function to calculate the gain factor "N(k)=log g (k)" of which as a behavior of having a softer rise in one range and as the variables are increase the rise is much faster of sharper, column 15 lines 10-20 and column 16 lines 9-16).

As to claim 15, Ubale discloses a sound reproduction or recording system as claimed in claim 12, wherein the system comprises a measurer for measuring line or transmission noise (N1) or an input for a value for line or transmission noise (N1) and an adjustor for adjusting the transition point or transition range (V) from the second (II) to the fourth range (IV) in dependence on amount of line or

transmission noise (N1) (the gain and quantization calculations vary according to estimated noise, column 14 lines 28-37).

As to claim 16, Ubale discloses a sound reproduction system as claimed in claim 1, wherein the sound reproduction system is a mobile telephone system (the quantized signal is encoded and passed by a transmission media such as a modulated communication path, i.e. mobile telephone system, column 5 lines 49-54).

As to claim 17, Ubale discloses a sound reproduction system as claimed in claim 1, wherein the signal processor is a digital signal processor (DSP) (the signal is quantized after passing through the analysis filter, of which is a DSP method, abstract lines 3-5).

As to claim 26, Ubale does not disclose specifically method for audio signal enhancement as claimed in claim 18, wherein the functional relationship between gain factor and input level is such that unvoiced phonemes are at least 6 dB more enhanced than voiced phonemes. Vierthaler teaches using a gain value adjustable in range (paragraph [0022]) of which is used to amplify certain regions of the signal particularly two regions that occur, a vowel of which has a range of low frequency and high amplitude of which is one range and a second range which is a consonant marked by a high frequency and low amplitude

(paragraph [0028] lines 1-6) an amplification is made to enhance these two ranges by having a difference of 6dB between the ranges (paragraph [0028] lines 6-12) and by amplifying the consonants relative to the vowel the intelligibility of speech in the audio signal is increased (paragraph [0004] lines 12-20).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Ubale with the method of using a gain factor specifically for a voice and unvoiced part of a speech as taught by Vierthaler. Doing so would have allowed for intelligibility to be increase by emphasizing the areas are hard to understand or hear when there is a vowel-consonant combination (paragraph [0004] lines 1-20).

As to claim 29, Ubale discloses a computer program comprising program code means for performing a method in accordance with claim 18 when said program is run on a computer (column 27 lines 6-26).

As to claim 30, Ubale discloses a computer program product comprising program code means stored on a computer readable medium for performing a method as claimed in claim 18 when said program is run on a computer (column 27 lines 6-26).

As to claim 31, Ubale discloses a computer program product comprising program code means for use in a system as claimed in claim 1, for performing the action specific for the invention (column 27 lines 6-26).

3. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ubale et al. (US 6,363,338) in view of Vierthaler (US PGPUB 2002/0173950) as applied to claims 1 and 2 and in further view of Borth et al. (US 4,630,305).

As to claim 3, Ubale or Vierthaler do not disclose specifically a sound reproduction system as claimed in claim 2, wherein the attributor (25) for attributing a gain factor (z) is arranged such that the first range (I) extends from the maximum (MAX) at least 15 dB, but not more 30 dB. Borth teaches using a gain value that can increase up to a max value (column 8 lines 50-65) of which has a max limit of 20 db (column 9 lines 1-10) because any background noise requiring suppressing higher than 20 dB degrades considerably the quality of the signal (column 2 lines 25-35).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Ubale and Vierthaler with the method of using a MAX value for the ranges as taught by Borth. Doing so would allow to avoid the degradation that is associated when

using a range of 20 or higher (column 2 lines 25-35) or even getting closer to the range of 50-60 dB of which is perceived as loud volumes by the human ear and degrades the quality of the signal by mixing with increased levels of noise as it is known in the art.

As to claim 9, Ubale or Vierthaler do not disclose specifically a sound reproduction or recording system as claimed in claim 1, wherein the system comprises a determinator for determining a maximum input level of a received signal and a means for equating the maximum input level with the upper edge of the first range. Borth teaches using a gain value that can increase up to a max value (column 8 lines 50-65) of which has a max limit of 20 db (column 9 lines 1-10) because any background noise requiring suppressing higher than 20 dB degrades considerably the quality of the signal, therefore it is required to determine a maximum input level so that the quality of the noise is not degraded, (column 2 lines 25-35).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Ubale and Vierthaler with the method of using a MAX value for the ranges as taught by Borth. Doing so would allow to avoid the degradation that is associated when using a range of 20 or higher (column 2 lines 25-35) or even getting closer to the range of 50-60 dB of which is perceived as loud volumes by the human ear and

degrades the quality of the signal by mixing with increased levels of noise as it is known in the art.

4. Claim 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ubale et al. (US 6,363,338) in view of Vierthaler (US PGPUB 2002/0173950) as applied to claims 1 and 2 and in further view of Davis et al. (US 5,890,125).

As to claim 7, Ubale or Vierthaler do not disclose specifically a sound reproduction or recording system as claimed in claim 6, wherein the predetermined time period (T.sub.a, T.sub.r) is 1 to 5 milliseconds. Davis teaches a method for audio signal processing and applying a gain factor according to the input signal (abstract) of which accomplishes the premasking interval in 5 ms or less (column 2 lines 19-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Ubale and with the method of having a dynamic level detector over a period of time as taught by Vierthaler of 5 ms or less as taught by Davis. Doing so would have allowed for the system to use a dyanamic level detector in an efficient time frame allowing more time for other more complex functions.

Conclusion

a. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication should be directed to Josiah Hernandez whose telephone number is 571-270-1646. The examiner can normally be reached from 7:30 pm to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JH

/David R Hudspeth/

Supervisory Patent Examiner, Art Unit 2626